

National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 3210 (DSI-3210)

Summary of the Day - First Order

March 18, 2003

National Climatic Data Center  
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Asheville, NC 28801-5001 USA

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**1. Abstract:** This Summary of the Day First Order data file contains daily selected elements of observations taken by certified observers. The stations are located worldwide and are operated by the National Weather Service (NWS), U.S. Air Force (Air Force Weather), U.S. Navy (Navy Weather Service), and the Federal Aviation Administration (FAA). A very small portion of this data dates back to 1890. Data from the late 1940's and onward comprise the bulk of this data set. These First Order Stations are usually fully instrumented and therefore record a complete range of meteorological parameters. The observations are generally recorded for the 24-HR period midnight to midnight.

Through the years, approximately 1,380 principle stations have recorded observations in the program. Stations have varying periods of record and varying types of data elements. In the early years of aviation most stations were located in major cities. As aviation became more sophisticated, stations shifted to airports. Areal coverage includes the contiguous United States, Caribbean Islands, Pacific Islands, and other overseas stations of the NWS, FAA, U.S. Navy, and U.S. Air Force.

Field elevations of fixed surface locations for the data set are mostly below 1,000 meters above sea level. The minimum elevation is 1 meter and the maximum is 2,300 meters.

The primary source of surface observational data in the United States is the Automated Surface Observing System (DS 3211). The [ASOS users guide](#) covers all essential aspects of system operation, including data acquisition, processing, and report formatting and dissemination. Elements, such as soil data, not found in DS 3210 can be found in DS 3200.

It must be noted that NCDC has the observations from the time the station opened, but the [NWS](#) has the current data. Official surface weather observation standards can be found in the [Federal Meteorological Handbook](#).

## **2. Element Names and Definitions:**

The first ten tape fields, the ID PORTION of the record, describe the characteristics of the entire record, i.e., the record type, observing station, element type, element units, year/hour, and the meteorological daily data and flags. The DATA PORTION of the record contains information about each element value reported. This portion is repeated for as many values as occur in the monthly record.

Each logical record is variable length with a maximum of 1230 characters. Each logical record contains a station's data for a specific meteorological element over one month interval.

### **List of Variables**

Element	Width	Position
001 Record Type	3	001-003
002 Station ID	8	004-011
003 Meteorological Element Type	4	012-015
004 Met. Element Measurement Units Code	2	016-017
005 Year	4	018-021
006 Month	2	022-023
007 Source Code 1		024

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3:

008 Source Code 2	1	025
009 Reserved for Future Use	2	026-027
010 Number of Data Portion Groups That Follow	3	028-030
011 Day of Month	2	031-032
012 Hour of Observation	2	033-034
013 Sign of Meteorological Value	1	035
014 Value of Meteorological Element	5	036-040
015 Quality Control Flag 1		041
016 Quality Control Flag 2	1	042
(017-022) Data Groups in the Same	12	043-054
(023-028) Form as Tape Fields 011-	12	055-066
as Needed to Contain One Month of Record	12	067-078
(197-202)	12	1219-1230

#### RECORD TYPE

The type of data stored in this record. (Value is "DLY"). Each record contains one month of daily values.

#### STATION-ID

This eight-digit numeric identifier (WBAN STATION NUMBER) is assigned by the National Climatic Data Center. The first 3 digits are zero's. WBAN NUMBER is a 5 digit number formulated to designate the station. A list of stations with their coordinates, elevation and period of record is available upon request. Values range from 00000001 through 00099999.

#### METEOROLOGICAL ELEMENT-TYPE

The type of meteorological element stored in this record is given as a 4-Character alphanumeric acronym. The following list denotes the specific elements contained in TD-3210. To determine which units are used for each element-type you must read Tape Field 004 "Element-Units" (Reference Table "A").

#### ASMM

Average Cloudiness Midnight to Midnight (begin September 1992 for ASOS sites). This is the average of all available 30-second ceilometer data for the 24-hour period expressed in tenths of cloud cover at or below 12,000 feet. The DATA-VALUES are defined in Reference Table AD@.

#### ASSS

Average Cloudiness Sunrise to Sunset (begin September 1992 for ASOS sites). This is the average of all available 30-second ceilometer data for the period from sunrise to sunset expressed in tenths of cloud cover at or below 12,000 feet. The DATA-VALUES are defined in Reference Table AD@.

#### AWND

Average Daily Wind Speed (begin 1984). Units expressed in miles per hour to tenths. From January 1984 through June 1987 the Element Unit is incorrectly listed as TK (Tenths of Knots), it should be MH (Miles per Hour to tenths).

#### CLDG

Cooling Degree Day (begin 1984). Base 65 degrees Fahrenheit.

#### DPNT

Departure from Normal Temperature. DATA-VALUE = -00099 to b00099 degrees

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:

Fahrenheit.

DPTP

Average Daily Dew-Point Temperature (begin 1984). Units expressed in tenths of degrees Fahrenheit.

DYSW

Daily Occurrence of WEATHER. These two digit DYSW element codes are stored in the rightmost four digits of the VALUE portion of the DATA-VALUE field. Within the four digits used, the weather codes are entered left justified. Thus, if one type of weather occurs during a day the VALUE field would appear as OXX00 where XX is the appropriate weather code. If two types of weather occur the VALUE field will contain OXXYY where XX is value 1 and YY is value 2. If more than 2 types of weather occur on the same day, they will be stored in additional DYSW records as needed. (Reference Table "A1")

DYVC

Day with Weather in the Vicinity (begin July 1996). The present (or prevailing) weather occurring at the time of the observation in the vicinity of the station, between 5 and 10 statute miles of the point of observation.

**NOTE: This element is used beginning July 1996 and is coded in the same manner as the element DYSW. See the description for DYSW for details. (Reference Table "A1")**

F2MN

Fastest 2-minute Wind Direction and Speed (begin September 1992 for ASOS sites). Direction is expressed in tens of degree from true north. Speed is expressed in miles per hour. When two or more equal speeds have occurred, the most recent speed and direction are entered. Example of DATA-VALUE field XXYYY for wind direction and speed: 22048. Wind is from 220 degrees at 48 miles per hour.

F5SC

Fastest 5-second Wind Direction and Speed (begin September 1992 for ASOS sites). Direction is expressed in tens of degrees from true north. Speed is expressed in miles per hour. When two or more equal speeds have occurred, the most recent speed and direction are entered.

FMTM

Time of Fastest Mile or Fastest 1-minute Wind (begin 1984), or Fastest 2-minute Wind (begin September 1992). Units are expressed in hours and minutes.

FRGB

Base of Frozen Ground Layer. The depth below the surface of the ground at which frozen ground is last struck. Data available through 1964 only for designated stations. DATA-VALUE = b00000 to b00099 expressed in whole inches.

FRGT

Top of frozen ground layer - The depth below the surface of the ground at which frozen ground is first struck. Data available through 1964 only for designated stations. DATA-VALUE = b00000 to b00099 expressed in whole inches.

FRTH

Thickness of Frozen Ground Layer. Base value minus top value. Data available through 1964 only for designated stations. DATA-VALUE = b00000 to b00099

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#### FSIN

Highest Instantaneous Wind Direction and Speed. This is the highest gust or peak reached by the pen of the gust recorder during the 24 hour period. Direction is expressed in 16 Point WBAN Code (Reference Table "B1"). Speed generally expressed in miles per hour. When two or more equal wind speeds occur the most recent is archived.

#### FSMI

Fastest Mile Wind Direction and Speed. Recorded by stations having triple or multiple register type recording instruments. The speed of a mile of wind occurring in the shortest time is used. This is determined by measuring the jogs on the chart made by the one mile contacts of the anemometer. Direction is expressed in 16 Point WBAN Code. Speed expressed in miles per hour. Example of value field XYYYY for wind direction and speed: 18045; 18 = wind direction from 169 degrees to 191 degrees. 045 = wind speed 45 miles per hour. FSMI is not digitized for Air Weather Service stations. (Reference Table "B1")

#### FSMN

Fastest Observed One-minute Wind Direction and Speed. This is used at stations not equipped with recording instruments. It is obtained by observation of an indicator for one minute and using an average value. Direction is expressed in Tens of Degrees Code. Speed expressed in miles per hour. Example of value field XYYYY for wind direction and speed: 18045; 18 = wind direction from 169 degrees to 191 degrees. 045 = wind speed 45 miles per hour. FSMN is not digitized for Air Weather Service Stations. (Reference table "C")

#### GAHT

River Gauge Height - Below zero gauge readings. DATA-VALUE = negative values of b00000 to b00999, expressed to the nearest tenth of a foot.

#### HTDG

Heating Degree Days (begin 1984; however, several stations reported this element as early as 1961). Base 65 whole degrees Fahrenheit.

#### MNRH

Minimum Relative Humidity (through 1955). DATA-VALUE = b00000 to b00100, expressed in whole percent. (USAF stations through January 1958, NWS, FAA, and Navy stations through December 1964. Most stations restarted in 1984; some stations reported this element as early as 1961).

#### MNTP

Average Temperature (begin 1984). The value is the (Max Temp. + Min Temp.)/2, expressed in whole degrees Fahrenheit.

#### MXRH

Maximum Relative Humidity. DATA-VALUE = b00000 to b00100, expressed in whole percent. (USAF stations through June 1958, NWS, FAA, and Navy stations through December 1964. Most stations restarted in 1986.)

#### PGTM

Peak Gust Time or Maximum 5-second Wind Speed Time. Value = b00000 to b02359, expressed in hours and minutes. Example: 2359 = 23 hours and 59 minutes.

#### PKGS

Peak Gust Direction and Speed. If two or more equal peak gust speeds occurred on the same day, the first was digitized for the period July 1968 through December 1972. Beginning in January 1973, the last was digitized. The

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direction is generally expressed in 16 Point WBAN Code, with the following exceptions:

(1) Air Force stations used 36 Point code from January 1964 through February 1967, 16 Point WBAN Code from March 1967 through June 1968, and 36 Point code again from July 1968 through December 1970. Air Force data was generally discontinued by December 1970.

(2) Navy stations used 16 Point WBAN Code from the beginning of record through January 1971, and 36 Point Code from February 1971 through the present.

Wind speeds are generally expressed in miles per hour through December 1954, and in knots from January 1955 to the present. A consistent exception is Navy stations, which used knots for the entire period of record. Example of value field XYYYY after 1954 for wind direction and speed: 44032; 44 = Wind direction from the SE. 032 = Wind speed 032 knots.

Beginning July 1996, wind direction is expressed in 32 Point WBAN Code (Reference Table "B2").

#### PRCP

Daily Precipitation. Rainfall and melted frozen precipitation are included. Trace is less than .005 inch. DATA-VALUE = b00000 to b99999 expressed in hundredths of inches.

#### PRES

Average Daily Station Pressure (begin 1984). Based on eight 3-hourly observations per day. Units expressed in thousandths of inches of Mercury.

#### PSUN

Daily Percent of Possible Sunshine (begin January 1965). Data Value = b00000 to b00100, expressed in percent.

#### RDIR

Resultant Wind Direction (begin 1984). DATA-VALUE expressed to the nearest whole degree code. From January 1984 through late 1994 the Meteorological Element Measurement units code is incorrectly recorded as DT (wind direction in tens of degrees). It should be DW (wind direction in whole degrees).

#### RWND

Resultant Wind Speed (begin 1984). DATA-VALUE is expressed in miles per hour to tenths. From January 1984 through June 1987, the Meteorological Element Measurement Units Code is incorrectly recorded as TK (tenths of knots) and incorrectly recorded as MH (miles per hour) from July 1987 through late 1994. It should be TL tenths of miles per hour.

#### SAMM

Average Cloudiness Midnight to Midnight - (begin September 1992 for ASOS sites). This is the average of all available 30-second ceilometer data for the 24-hour period expressed in oktas of cloud cover at or below 12,000 feet. The DATA-VALUES are defined in Reference Table AD1".

#### SASS

Average Cloudiness Sunrise to Sunset (begin September 1992 for ASOS sites). This is the average of all available 30-second ceilometer data for the period from sunrise to sunset expressed in oktas of cloud cover at or below 12,000

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feet. The DATA-VALUES are defined in Reference Table AD1".

#### SCMM

Average Sky Cover Midnight to Midnight (begin January 1965). Element not recorded at stations where personnel were not on duty 24 hours a day. See Elements ASMM and STMM for ASOS sites. DATA-VALUES are expressed in tenths and are defined in Reference Table "D".

#### SCSS

Average Sky Cover Sunrise to Sunset - (begin January 1965). DATA-VALUES are expressed in tenths and are defined in Reference Table "D". See Elements ASSS and STSS for ASOS sites.

#### SGMM

Average Cloudiness Midnight to Midnight (begin September 1992; end June 1996; derived from GOES satellite data). The areal coverage is approximately 50km by 50km centered on the ASOS site. DATA-VALUE is the average of all satellite scans of the site during the 24-hour period, expressed in oktas of cloud cover occurring above 12,000 feet. The DATA-VALUES are defined in Reference Table AD1".

#### SGSS

Average Cloudiness Sunrise to Sunset (begin September 1992; end June 1996; derived from GOES satellite data). The areal coverage is approximately 50km by 50km centered on the ASOS site. DATA-VALUE is the average of all satellite scans of the site during period from sunrise to sunset, expressed in oktas of cloud cover occurring above 12,000 feet. The DATA-VALUES are defined in Reference Table AD1".

#### SLVP

Average Daily Sea Level Pressure (begin 1984). DATA-VALUE expressed in tenths of millibars.

#### SMMM

Average Sky Cover Midnight to Midnight (begin January 1965). Element not recorded at stations where personnel were not on duty 24 hours a day. See Elements SAMM and SGMM for ASOS sites. DATA-VALUES are expressed in oktas and are defined in Reference Table "D1".

#### SMSS

Average Sky Cover Sunrise to Sunset - (begin January 1965) DATA-VALUES are expressed in oktas and are defined in Reference Table "D1". See Elements SASS and SGSS for ASOS sites.

#### SNOW

Daily Snowfall. Hail is included with snowfall from July 1948 to December 1955 and from May 1989 to the present. Effective April 1970, amount includes sleet/ice pellets. DATA-VALUE = b00000 to b99999 expressed in tenths of inches. Trace of snow is less than .05 inch.

#### SNWD

Snowdepth at Observation Time. Hail is included with snowfall from July 1948 to December 1955 and from May 1989 to the present. (Reference Table "E")

#### STMM

Average Cloudiness Midnight to Midnight (begin September 1992; end June 1996; derived from GOES satellite data). The areal coverage is approximately 50km by

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50km centered on the ASOS site. DATA- VALUE is the average of all satellite scans of the site during the 24-hour period, expressed in tenths of cloud cover occurring above 12,000 feet.

STSS

Average Cloudiness Sunrise to Sunset (begin September 1992; end June 1996; derived from GOES satellite data). The areal coverage is approximately 50km by 50km centered on the ASOS site. DATA-VALUE is the average of all satellite scans of the site during period from sunrise to sunset, expressed in tenths of cloud cover occurring above 12,000 feet.

THIC

Thickness of Ice on Water. Measured each Monday at noon LST, or more frequently if ice conditions are changing rapidly. Data available through December 1964 only for designated stations. DATA-VALUE = b00000 to b00999, expressed in tenths of inches.

TMAX

Daily Maximum Temperature. DATA-VALUE = -00199 to b00199, expressed in whole degrees Fahrenheit.

TMIN

Daily Minimum Temperature. DATA-VALUE = -00199 to b00199, expressed in whole degrees Fahrenheit.

TMPW

Average Daily Wet-Bulb Temperature (begin 1984). DATA-VALUE = -00199 to b00199, expressed in whole degrees Fahrenheit.

TSUN

Daily Total Sunshine. DATA-VALUE = b00000 to b01440, expressed in minutes. (Reference Table "F")

WTEQ

Water Equivalent of Snow on the Ground (begin July 1952). Reported only when there are 2 inches or more of snow on the ground. Readings taken generally at 1800 GMT. DATA-VALUE expressed in hundredths of inches from 1952 through April 10, 1970 and in tenths of inches from April 11, 1970 until the present.

METEOROLOGICAL ELEMENT MEASUREMENT UNITS CODE.

(Reference Table "A")

YEAR

This is the year of record. Range of values from 1881 (few stations) to current year processed.

MONTH

This is the month of the record. Range of values is 01 to 12.

SOURCE CODE-1

Contains a code indicating the primary source of the original record for this element. Range is 1-9 and A -Z. (Reference Table "G")

SOURCE CODE-2

Contains a code indicating the backup source of the original record for this element. Range is 1-9 and A - Z. (Reference Table "H")

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#### NUM-VALUES

This notates the actual number of values reported. Range = 001 to 062.

**NOTE: A record may contain fewer or more data values than you might expect. A monthly record of daily values may contain as few as 1 data value or as many as 62 data values.**

**If a particular data value was not taken or is unavailable there is no entry for it. (If all observations are received and pass QC checks there will be one data group for each day. If each value fails QC there may be 2 data groups for each day). When two groups for a day are encountered the original values are flagged and the 2nd data group is the best possible replacement.**

#### DAY

Contains the day of the daily element value. Range = 01 to 31. Data are for the 24-hour period midnight to midnight LST.

#### HOURL

Contains the hour of the daily observation. Hour is reported as 24 representing a 24-hour period midnight to midnight.

#### SIGN of

This is the "SIGN" of the meteorological Data Element Value. This field contains either a blank or a minus sign (never a plus sign).

#### DATA-VALUE

Actual data value. The DATA-VALUE (DATA ELEM VALUE) portion of the tape field is a five digit integer. One major exception does exist however. DYSW (days with weather code and days with weather in the vicinity) element-type values are explained under METEOROLOGICAL ELEMENT-TYPES DYSW and DYVC.

#### FLAG1

The Data Measurement Flag.(Reference Table "J")

#### FLAG2

Data Quality Flag.(Reference Table "K")

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\*\*\*\*\* TABLE "A" \*\*\*\*\*

METEOROLOGICAL ELEMENT MEASUREMENT UNITS CODE

The units and decimal position of the data value for this record. Range of values is listed below.

C	Whole degrees Celsius
CM	Centimeters
D	Whole Fahrenheit degree days
DT	Wind direction in tens of degrees
DW	Wind direction in whole degrees
F	Whole degrees Fahrenheit
FN	Feet and tenths
FT	Whole feet
HF	Hundreds of feet
HI	Hundredths of inches
HM	Hundredths of miles
HR	Time in hours and minutes
HT	Hundredths of inches but observation was only made to tenths
I	Whole inches
IH	Hundredths of inches of mercury
IT	Thousandths of inches of mercury
KD	Knots and direction in tens of degrees
KS	Knots and direction in 16 pt. code
M	Whole miles
MD	MPH and direction in tens of degrees
ME	Whole meters
MH	Miles per hour
MM	Millimeters
MN	Minutes
MS	MPH and direction in 16 pt. code
MT	Tenths of millibars
NA	No units applicable (none-dimensional)
N1	No units applicable - element to tenths
N2	No units applicable - element to hundredths
OS	Oktas of sky cover
P	Whole percent
TC	Tenths of degree Celsius
TD	Tenths of Fahrenheit degree days
TF	Tenths of degrees Fahrenheit
TH	Tenths of hours
TI	Tenths of inches
TK	Tenths of knots
TL	Tenths of miles per hour
TM	Tenths of millimeters
TP	Tenths of percent
TS	Tenths of sky cover

Note: All single digit Element-Units are left justified and blank filled.

\*\*\*\*\* TABLE "A1" \*\*\*\*\*

DYSW/DYVC

00	No occurrence
01	Day with haze (smoke also included through August 1992; see code 30 in

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this table)

- 02 Day with fog (ice fog included through 1983; see code 17 in this table)
- 03 Day with heavy fog (heavy ice fog included through 1964)
- 04 Day with drizzle (begin 1984)
- 05 Day with ice pellets (sleet and small hail; small hail included through June 1996; see code 31 in this table)
- 06 Day with glaze
- 07 Day with thunder
- 08 Day with hail (1/4 inch or larger in diameter beginning July 1996)
- 09 Day with volcanic ash (begin September 1992; dust or sandstorm with visibility < 5/8 mile was reported as code 09 through August 1992; see codes 27 and 29 in this table)
- 10 Day with blowing snow (includes drifting snow beginning July 1996)
- 11 Day with high wind (squall; speeds increasing to at least 16kts/18mph and sustained at 22kts/25mph or more for at least one minute; begin July 1996)
- 12 Day with tornado (funnel cloud, waterspout included through Aug 1992; see codes 20 and 21 in this table)
- 13 Day with snow (snow pellets, snow grains, and ice crystals included through Aug 1992; see codes 22, 23, 24 in this table)
- 14 Day with rain (drizzle, freezing drizzle, and freezing rain included through 1983)
- 15 Day with freezing rain (begin 1984)
- 16 Day with freezing drizzle (begin 1984)
- 17 Day with ice fog (begin 1984; includes freezing fog beginning July 1996)
- 18 Day with blowing spray (begin 1984; includes spray beginning July 1996))
- 19 Day with unknown source of precipitation (begin 1991 with automated stations)
- 20 Day with funnel cloud (begin September 1992)
- 21 Day with waterspout (begin September 1992; includes tornado beginning July 1996)
- 22 Day with snow pellets (begin September 1992 through June 1996; see code 31 in this table)
- 23 Day with snow grains (begin September 1992)
- 24 Day with ice crystals (begin September 1992)
- 25 Day with ground fog (begin September 1992)
- 26 Day with dust (begin September 1992)
- 27 Day with blowing dust (begin September 1992; includes duststorm when visibility is reduced to less than 5/8 miles beginning July 1996)
- 28 Day with blowing obstruction (begin September 1992 through June 1996)
- 29 Day with blowing sand (begin September 1992); also includes sand as well as sandstorm when visibility is reduced to less than 5/8 mile (begin July 1996)
- 30 Day with smoke (begin September 1992)
- 31 Day with small hail and/or snow pellets (begin July 1996; diameter less than 1/4 inch)
- 32 Day with well developed dust/sand whirls (begin July 1996)
- 33 Day with mist (begin July 1996)
- 34 Day with rain or snow shower; used in reference to weather in the vicinity only (begin July 1996)

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\*\*\*\*\* TABLE "B1" \*\*\*\*\*

FSIN

WIND DIRECTION CODE  
(16 Point WBAN Code)

12 = NNE	66 = SW
22 = NE	76 = WSW
32 = ENE	77 = W
33 = E	78 = WNW
34 = ESE	88 = NW
44 = SE	18 = NNW
54 = SSE	11 = N
55 = S	00 = Calm
56 = SSW	= Unknown

Example of DATA-VALUE field XYYYY for wind direction and speeds: 12037 Wind is from the NNE at 37 miles per hour.

\*\*\*\*\* TABLE "B2" \*\*\*\*\*

PKGS

WIND DIRECTION CODE  
(36 Point WBAN Code)

03 = NNE	21 = SSW
05 = NE	24 = SW
07 = ENE	25 = WSW
09 = E	27 = W
12 = ESE	30 = WNW
14 = SE	32 = NW
16 = SSE	34 = NNW
18 = S	36 = N

\*\*\*\*\* TABLE "C" \*\*\*\*\*

FSMI & FSMN

WIND DIRECTION CODES

00 = Calm  
01 = 010  
02 = 020  
" "  
" through "  
36 = 360  
99 = Unknown

\*\*\*\*\* TABLE "D" \*\*\*\*\*

SKY COVER in TENTHS for ELEMENTS:  
ASMM/ASSS/SCMM/SCSS/STMM/STSS

DATA-VALUE

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<u>CODE</u>	<u>SKY COVER</u>
00000	= Clear or less than .1 coverage
00001	= .1 Coverage
00002	= .2 Coverage
00003	= .3 Coverage
00004	= .4 Coverage
00005	= .5 Coverage
00006	= .6 Coverage
00007	= .7 Coverage
00008	= .8 Coverage
00009	= .9 Coverage
00010	= 1.0 Coverage - Overcast

\*\*\*\*\* TABLE "D1" \*\*\*\*\*

SKY COVER in OKTAS for ELEMENTS:  
SAMM/SASS/SGMM/SGSS/SMMM/SMSS

<u>DATA-VALUE</u>	<u>CODE</u>	<u>SKY COVER</u>
	00000	= Clear or less than .1 coverage
	00001	= .1 Coverage
	00002	= .3 Coverage
	00003	= .4 Coverage
	00004	= .5 Coverage
	00005	= .6 Coverage
	00006	= .8 Coverage
	00007	= .9 Coverage
	00008	= 1.0 Coverage - Overcast

\*\*\*\*\* TABLE "E" \*\*\*\*\*

SNWD

DEPTH of SNOW OBSERVED AT:

00:30 GMT prior to July 1952  
 12:30 GMT 1 July 1952 to 30 May 1957  
 12:00 GMT 1 June 1957 to present

DATA-VALUE = b00000 to b99999 in whole inches. Trace of snow depth is less than 0.5 inches. Some Alaska and part-time stations take snow depth measurements at different hours.

\*\*\*\*\* TABLE "F" \*\*\*\*\*

TSUN

Conversion of minutes to tenths of hours is:

MIN	TENTHS		
1-2	0.0	33-38	0.6
3-8	0.1	39-44	0.7
9-14	0.2	45-50	0.8
15-20	0.3	51-56	0.9
21-26	0.4	57-60	1.0
27-32	0.5	A	ASOS

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\*\*\*\*\* TABLE "G" \*\*\*\*\*

SOURCE CODE TABLE 1

1 Original Manuscript  
2 SRRS  
3 AFOS  
4 DATSAV  
5 NMC  
6 Foreign Keyed  
7 MAPSO  
8 SRR 'A' side, manuscript 'B' side  
9 Other/unknown  
A ASOS

Source codes reflect normally expected sources and do not necessarily indicate actual source of a specific item.

\*\*\*\*\* TABLE "H" \*\*\*\*\*

SOURCE CODE TABLE 2

1 Original Manuscript  
2 SRRS  
3 AFOS  
4 DATSAV  
5 NMC  
6 Foreign Keyed  
7 MAPSO  
8 SRRS 'A' side, manuscript 'B' side  
9 Other/unknown  
A ASOS

\*\*\*\*\* TABLE "J" \*\*\*\*\*

FLAG1 TABLE

A Accumulated amount. This value is the amount accumulated since the last measurement. (SNOW, SNWD, PRCP)  
B Accumulated Amount. Value includes estimated values. (SNOW, SNWD, PRCP)  
D Derived Value.  
E Estimated Value.  
M Data Element Missing. This is for fixed length records only.  
P Multiple occurrence Peak Gust. Last occurrence is indicated. (PKGS, FSIN, FSMI)  
S Included in a Subsequent Value. This precipitation amount is being accumulated. Total will be included in a subsequent value. (TPCP, SNOW, SNWD)

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T Trace of Precipitation, Snowfall or Snow depth. Value would be '00000'.  
(TPCP, SNOW, SNWD)

b (blank) Not needed.

#### TABLE "K"

##### FLAG2 TABLE

- 0 Observed data has passed all internal consistency checks
- 1 Validity indeterminable (primarily for pre-1984 data)
- 2 Observed data has failed an internal consistency check - (subsequent edited value follows observed value)

- 3 Data prior to 1 January 1984 = Observed data exceeded preselected climatological limits during conversion from historic TD-9750 files. (No edited value follows)

Data beginning 1 January 1984 through 1988 and data beginning 1996 through current = Observed data has failed an internal consistency check. (No edited value follows) (Low level of confidence of observed value)

Data beginning 1989 through 1995 = Observed data has failed an internal consistency check but passed a manual inspection of the data. (No edited value follows)

- 4 Observed data value invalid. (No edited value follows)
- 5 Data converted from historic TD-9750 files exceeded all known climatological extremes. No edited value follows)
- D Wind direction code is invalid (PKGS through December 1983 only)
- E Edited data value passes all systems checks - no observed value present
- S Manually edited value passes all systems checks

3. **Start Date:** 1881

4. **Stop Date:** Ongoing

5. **Coverage:** North America, Caribbean, Pacific islands, and other overseas stations of the NWS, FAA, U.S. Navy, and Air Force

Southernmost Latitude: 90S  
Northernmost Latitude: 90N  
Westernmost Longitude: 180W  
Easternmost Longitude: 180E

6. **How to Order Data:**

Ask NCDC's Climate Services about costs of obtaining this data set.  
Phone: 828-271-4800  
FAX: 828-271-4876  
E-mail: [NCDC.Orders@noaa.gov](mailto:NCDC.Orders@noaa.gov)

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**7. Archiving Data Center:**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, NC 28801-5001

**8. Technical Contact:**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, NC 28801-5001  
Phone: 828-271-4800

**9. Known Uncorrected Problems:** There are known problems in this data set. Those problems are being addressed by a program ValHiDD (Validation of Historical Daily Data).

During the period 1984-86 there are numerous entries for element PRCP of "NA" for the meteorological Element Units Code. These should be coded as "HI".

In 1988 for states 31-91 (North Carolina to Pacific Islands), the algebraic sign of positive meteorological data values may be coded as "+" symbols instead of as blanks.

The historical data were converted from existing digital files and placed in the element structure format in 1983. At that time these data were only processed through a gross value check. In January 1984, NCDC instituted greatly enhanced computer algorithms for automated validation of digital archives. The revised edit system performs internal consistency checks, climatological limits checks and serial checks. It is the goal of the NCDC that, as resources permit, these historical files will be brought up to the same level of quality as those from 1984 onward.

Quality control "flags" are appended to each element to show how they fared during the edit procedures and to indicate what, if any, action was taken. The files consist of observed values and, as necessary, edited values. Flags must be checked at all times to determine if an edited value is present.

The typical progression of temperature instruments was from liquid-in-glass thermometers, to (1960 series) Hygrothermometers, to (1980 series) Hygrothermometers. Scientists are currently investigating the effect these instrument changes (especially the 1980 series) may have on long term temperature records.

Inventories of the DSI-3210 data set are available which indicate missing data periods by station for most elements.

**Maximum and Minimum Relative Humidity**

For the period July 1996 through December 1998 the twenty four (24) hour maximum and minimum relative humidities reported as 00000 and 00100 are incorrect. These values were incorrectly generated for stations that did not report relative humidity.

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## **Maximum and Minimum Temperature**

National Weather Service, and Federal Aviation Stations: These values are determined from stations equipped with maximum and minimum thermometers or recording instruments. For some sites, when instruments were inoperative, values were selected from hourly observations.

U.S. Air Force Stations: From May 15, 1955, for stations taking 24 record observations per day, the maximum and minimum temperatures are determined from hourly observations. The observations at the beginning and ending of day are considered. The values are reported as missing when more than 3 of the hourly observations pertinent to the determination of max and min temperatures for each 24-hour period are missing or erroneous.

U.S. Navy Stations: When maximum and minimum thermometer readings are not available, the data at most stations are reported as missing. Some Navy stations determine the maximum and minimum temperatures from hourly observations when readings from maximum and minimum thermometers are not available.

## **Hail and Snowfall Amounts**

Although the inclusion of hail amounts with snowfall amounts was discontinued after December 31, 1955, some stations may have hail amounts included with snowfall after this date, as late as 1963 at a few stations. This occurred because on the original manuscript form the same column was used for the entry of snow, sleet and hail and the entry was not indicated as hail. For NWS sites, hail was again included in snowfall amounts beginning in 1989.

**10. Quality Statement:** This data set has been used in countless climatological studies, litigations, insurance claims, and various other research applications.

It must be understood that at the onset of punched card processing of climatological observations, the primary goal was the publication of the monthly climatological summaries. The conversion from manual to automated systems meant that more work could be done faster with fewer people and at less cost. Even though the punched cards were retained, it was never envisioned that 20 to 30 years from then a great number of users would be seeking large data files for retrospective studies using high-speed computers.

Benign neglect, state-of-the-art processing (CIRCA 1952), and limited resources (monetary and personnel) all contributed toward less than optimum conditions for maintaining the integrity of the digital files. Many of these shortcomings are now recognized and efforts are underway to upgrade the principal data sets.

**11. Essential Companion Datasets:** DSI-3210 requires use of NCDC's in-house Station History file.

## **12. References:**

National Weather Service, 1993: National Weather Service Observing Handbook No. 7, Surface Observations, NOAA-NWS, Silver Springs MD.

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National Weather Service, June 1992: ASOS Users Guide, NOAA-NWS, Silver Springs, MD.

National Weather Service, April 1988: Surface Observations, Federal Meteorological Handbook No. 1 (FCM-H1-1988), Office of the Federal Coordinator, Dept of Commerce, Washington, D.C.

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National Climatic Data Center, March 1993: Local Climatological Data. Environmental Information summary (C-2), NOAA-NCDC, Asheville, NC.  
Hughes, P.Y., E.H. Mason, T.R. Karl, and W.A. Brower, 1992: United States Historical Climatology Network Daily Temperature and Precipitation Data - ORNL/CDIAC-50, NPD-042. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 40 pp.